

Climate Change and Scotland's Response

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To start, I need to introduce four concepts: Climate Change, Greenhouse Gases, Carbon Neutrality and Carbon Footprint

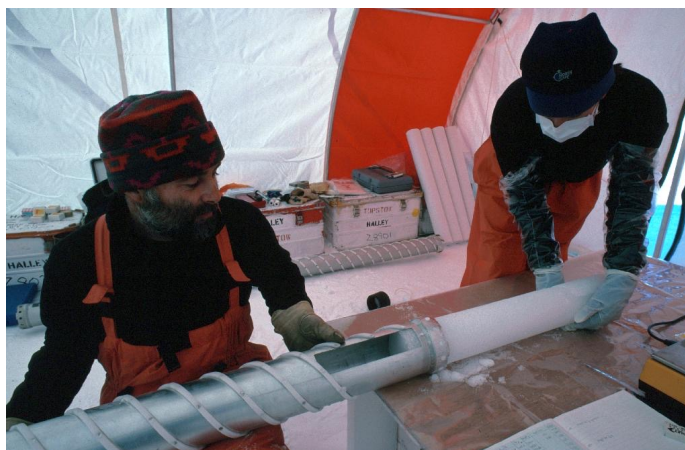
Climate Change is the defining issue of our time and we are at a defining moment. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale. Without drastic action today, adapting to these impacts in the future will be more difficult and costly.

Greenhouse gases occur naturally and are essential to the survival of humans and millions of other living things, by keeping some of the sun's warmth from reflecting back into space and making the Earth habitable. But after more than a century and a half of industrialization, deforestation, and large-scale agriculture, quantities of greenhouse gases in the atmosphere have risen to record levels not seen in three million years. As populations, economies and standards of living grow, so does the level of greenhouse gas emissions to the atmosphere.

Carbon neutrality is the need to achieve ecological balance between activities that emit climate pollution and processes that reduce the impact of that pollution to zero. It means a phase out of fossil fuel emissions accompanied by a phase in of energy efficiency and renewable energy, complemented by measures to bring down emissions from agriculture and forestry so as to achieve overall ecological balance.

Carbon footprint is the amount of carbon dioxide released into the atmosphere as a result of the activities of an individual, organisation or community. Your personal footprint is determined chiefly by the food and drink you consume, your home and its energy needs, the travelling you do, and the things you own.

The science of climate change



Drilling a deep ice core to recover climate information from the past

All climate scientists accept that the world will get warmer and warmer if humanity continues to demand more and more energy from oil and gas to create an easier lifestyle for the future. The scientists still argue amongst themselves how strong the warming will be. Many say that a warmer world will lead to a climate catastrophe, such as a mass extinction with our coastal cities inundated. I agree with these people based on my professional life as an Antarctic glaciologist. The most dramatic climate events of the past one million years has been the numerous transitions into and out of Ice Ages from Interglacials. And we live in an Interglacial now.

Why were ice ages so cold? How could the Earth plunge from conditions similar to that of the last few centuries into an ice age and back again? The predominant reason is that in ice ages the concentration of Greenhouse gases in the atmosphere reduced significantly.



Air bubbles in an ice core to discover the concentrations of greenhouse gases in the past.

Fortunately we also know how much colder it was then. This information allows an independent assessment of how sensitive global temperatures are to the concentrations of greenhouse gases, and therefore what the future may hold. The future looks grim. We are heading for a period just as extreme in the warm direction as ice ages were in the cold direction – an extreme when glaciers were three miles deep over Scotland and sea level 120 m lower. From the Ice Age to the Pre-industrial Era, CO₂ levels increased by 50% and with an increase in rainfall. Today CO₂ levels are 50% higher than the Pre-industrial period, with global temperatures 1°C warmer, and each year atmospheric CO₂ levels rise and the warming trend continues. In the last interglacial period around 100,000 years ago the sea reached a level 4 to 6 m higher than today; it is sobering to realise that a similar increase will occur in the distant future unless atmospheric CO₂ levels can be lowered from their present value, otherwise still higher sea levels are inevitable.

Choices and international action

Humanity has a choice. We could do nothing (the so-called Business as Usual scenario), and the world warms indefinitely and we adapt to whatever the consequences are. Or we could work together, decide how much warmer a world could be tolerated, and find a way to achieve it. This second approach has the backing of most governments and the United Nations (UN).



Business as Usual

Scientists have been advising the UN of the seriousness of failing to curb a warming climate, and on strategies to ensure global temperatures stabilize at a target temperature warmer than today. At the UN Climate Conference in Paris in 2016, the target discussed was 2°C above pre-industrial levels (1°C warmer than now), while scientists provided convincing evidence to restrict warming to just 1.5°C. At the end of the Paris Conference, an Agreement was signed by 194 nations requiring them to work towards keeping the global temperature rise to well below 2°C, and to pursue efforts to limit the temperature increase to the more challenging target of 1.5°C.

A 2°C warming requires the world to be carbon neutral before 2050, and the faster that target is approached, the more likely a lower 1.5°C warming might be achievable. The 194 parties to the Agreement were tasked to propose how far and fast they could contribute to carbon neutrality by 2050, and they agreed to meet again in New York in 2019 to review progress and table more ambitious proposals.

Climate awareness in 2019



Storm surge in Galway: More intense storm activity will result from global warming

2019 has been a momentous year for exposing the issue of climate change. In the UK, 205 local authorities (including Highland Council), many UK companies, parliaments in England, Wales and Scotland declared Climate Emergencies to tackle climate change, committing them to take urgent action to reduce their carbon emissions at a local level, and some authorities aspired to go carbon neutral by 2025. Extinction Rebellion closed streets in major cities across the world, climate strikes by school children worldwide inspired by Greta Thunberg added to the urgency, and the Scottish Parliament not only declared it will be carbon neutral by 2045, but also brought into law Scotland's New Climate Change Bill with a reduction of emissions of 75% by 2030, the first parliament in the world to do so.

There is a major problem for being carbon neutral by any date whether it be 2025, 2045 or 2050. The world's fossil fuel reserves if burnt over any time scale will put too much CO₂ into the atmosphere. It will be impossible for the world to become carbon neutral unless some of the fuels are kept below ground. Scotland has banned fracking (after seven years of deliberation and consultation), but has made no move to limit oil and gas extraction around the coast. Tax revenues from the oil industry are too important for Scotland's economy, but a global solution to climate change must ultimately consider which potential sources of energy are unexploited.

In September 2019 the UN Climate Change Meeting in New York was notable for Greta Thunberg's impassioned address: "You have stolen my dreams and my childhood with your empty words. People are suffering. People are dying. Entire ecosystems are collapsing. We are in the beginning of a mass extinction. And all you can talk about is money and fairytales of eternal economic growth." The UN Meeting fell short on "more ambitious proposals" from governments to accelerate the drive to carbon neutrality, but some wealthier countries including the UK promised to double their funding to the UN's Green Climate Fund, to help developing countries reduce their emissions, and adapt to the unavoidable consequences of warming. In

2020 Scotland will host the next major UN Conference on Climate Change when 30,000 delegates are expected to produce an international response to the Climate Emergency.

Scotland's politicians have not consulted us about how we might be involved to meet its now legal carbon neutral targets. Most people I suspect believe that if the government says Scotland will meet a target it can be done almost without us noticing. Even with electric cars, electric bicycles, more wind turbines, heat pumps, better efficiency of household equipment, can we all continue otherwise with "Business as Usual" and meet the target. I doubt it. Not only must our energy use be based on renewables, but, as the late Chief Scientist to DEFRA argued, we should plan to use half as much energy as we do now.



Highland Council's own Climate Emergency Declaration includes "the promise to work towards a carbon neutral Highlands by 2025, and to commit to listening to and involving Highland citizens in all that we do and to involve them in the preparation of our new carbon reduction plan." A public involvement is also central to Scotland's New Climate Change Bill.

Carbon Reduction Plans



Hoping for a silver lining!

If Scotland and Highland Council are to develop carbon reduction plans, it must be time for each of us to prepare a personal one. Will you commit to reduce your carbon footprint?

Would you be happy to travel less? Find your leisure nearer home? Forgo weekends away? This week the BBC reported that, in the US and UK, people were deciding to travel by air up to 25% less next year compared to this. It was in Sweden that the concept of "flight shame" surfaced. Will there soon be "car shame" when owners of less efficient and more polluting cars feel ostracized? Will governments legislate to ban environmentally unfriendly cars in their strategy to be carbon neutral?

Would you be happy to shop less and buy more durable goods? Most fast fashion is made from derivatives of oil and not from natural fibres. Could you avoid being a consumer, except for essentials? Buy less – throw away less?

Would you be prepared to live in a cooler home? Wear more sweaters?

Do you question the environmental costs of the food you eat? Do you know how much energy, water and oil-created fertilizers are needed to produce a kilo of beef, rice or vegetables? Do you realize how far rain forests are being sacrificed to produce the feedstock of farm animals? Do you question where your food is produced and how far it is transported? All personal questions, but food choices have a bearing on how successfully the world can attain carbon neutrality.

Spreading the word and living the life

If you think these issues important, you will find like-minded folk from the Black Isle to share your concerns with in Transition Black Isle. Transition Black Isle is part of an international network of Transition communities working towards making the lives of their members more satisfying and sustainable in the face of resource depletion and climate change. Each of us are part of wider communities – colleagues at our places of work or leisure activities, our personal friends and families. We should be brave enough to start conversations with them on Climate Change as well as putting pressure on politicians, as we know that one individual response is not going to be enough.

We should all assess our carbon footprint and commit to a personal carbon reduction plan. Every person in Highland will be a small player in Highland Council's carbon reduction plan, and be a smaller player still in Scotland's plan. All will be playing a part of the UN-led carbon reduction plan that needs to be successful to secure a habitable Earth for our children and grandchildren in the years to come

Ten Key Behaviour Areas

If everyone in Scotland drives more efficiently – saving up to 15% of fuel use – together we can save 1.3 million tonnes of CO₂ annually. This is equivalent to taking around 440,000 cars off the road.

If everyone recycles one more newspaper or magazine a month, together we will save over 11,000 tonnes of CO₂ per year – equivalent to making over 16 million cups of tea.

Turning your thermostat down by one degree is one of the best energy saving actions you can take. If all of us in Scotland turn the dial, together we will reduce housing emissions by 10%.

1. Keeping the heat in (insulation, draught proofing, double glazing) 
2. Better heating management (turning down heating thermostat to between 18° and 21°, reducing the hours the heating is on, and turning down hot water thermostat to a maximum of 60°)
3. Saving electricity (buying energy efficient appliances, lightbulbs, TVs and other products when they need to be replaced, washing clothes at low temperatures)
4. Installing a more energy-efficient heating system or generating your own heat by replacing inefficient boilers with condensing boilers and/or microgeneration (e.g. solar water heating, biomass boiler, heat pump)
5. Becoming less reliant on the car (walking, cycling, using public transport and/or car-sharing instead of driving) 
6. Driving more efficiently (using a low carbon vehicle (fuel efficient, hybrid, alternative fuel or electric), and/or following fuel-efficient driving principles)
7. Using alternatives to flying where practical (e.g. train or teleconferencing for business)
8. Avoiding food waste 
9. Eating a healthy diet high in fruit and vegetables, in season where we live
10. Reducing and reusing in addition to the efforts we already make on recycling 

The food we waste in our households creates 1.7 million tonnes of CO₂ each year. Stopping this waste will be equivalent to taking around 475,000 cars off the road in terms of cutting emissions – that's one in five!

If everyone in Scotland drives five miles a week less than they do now, together we will save 190,000 tonnes of CO₂ annually – equivalent to taking nearly 70,000 cars off the road.

If everyone in Scotland washes their clothes at 30°, together we will save 56,000 tonnes of CO₂ per year – equivalent to taking 20,000 cars off the road.